Amendments to the Claims:

1. (currently amended) A method of equalization of symbols transmitted over a channel having a channel impulse response h_i, said method comprising the steps of:

calculating the impulse response of previously estimated symbols utilizing said channel impulse response h_i and previously estimated decisions;

selecting a window having a size of one or more symbols and removing [[the]] an influence of previously estimated symbols from the received signal ~~so as~~ to generate a modified received signal;

correlating said modified received signal with said channel impulse response to obtain a correlation for each symbol in the window;

estimating the results of the correlation ~~so as~~ to yield a new estimate of said one or more of ~~said transmitted~~ symbols; and

repeating said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~.

2. The method according to claim 1, wherein said step of removing the influence of previously estimated symbols comprises subtracting the impulse response of previously estimated symbols from the current receive sequence.

3. (currently amended) The method according to claim 1, wherein said step of estimating to yield a new estimate of the symbols after the influence of said ~~other~~ previously estimated symbols is removed comprises using linear equalization operating on one or more neighboring symbols.

4. The method according to claim 3, wherein the linear equalization is based on an inverse channel estimation coefficient matrix.

5. The method according to claim 1, wherein said symbols transmitted over the channel comprise 2-PSK symbols (Binary PSK (BPSK)).

6. The method according to claim 1, wherein said symbols transmitted over the channel comprise 4-PSK symbols (Quadrature PSK (QPSK)).

7. The method according to claim 1, wherein said symbols transmitted over the channel comprise Quadrature Amplitude Modulation (QAM) symbols.

8. (currently amended) The method according to claim 1, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are repeated until an error difference between the symbol decision generated during the current iteration and the symbol decision generated during the previous iteration is less than a predetermined value.

9. (currently amended) The method according to claim 1, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are repeated [[for]] a fixed number of times.

10. (currently amended) The method according to claim 1, wherein the step of estimating comprises applying non-linear estimation to said correlation ~~values~~ results.

11. (currently amended) The method according to claim 10, wherein the step of applying non-linear estimation to said correlation ~~values~~ results comprises multiplication of said correlation ~~values~~ results by a matrix followed with processing by a decision function.

12. The method according to claim 11, wherein said matrix is obtained from inversion of a channel autocorrelation matrix.

13. The method according to claim 11, wherein said decision function comprises a hard decision function.

14. The method according to claim 11, wherein said decision function comprises a soft decision function.

15. The method according to claim 11, wherein said decision function comprises a soft decision function adapted to utilize a hyperbolic tangent function.

16. The method according to claim 11, wherein said decision function comprises a soft decision function whose decision slope changes over time.

17. The method according to claim 11, wherein said decision function comprises a soft decision function whose decision slope increases over time.

18. The method according to claim 1, wherein said window size is 1.

19. The method according to claim 11, wherein said window size is 1 and said matrix is reduced to scalar normalization only.

20. The method according to claim 1, wherein said window size is 2.

21. The method according to claim 1, wherein said window size is 2 and said step of estimation is performed using a matrix.

22. The method according to claim 1, wherein said steps of calculating, selecting, removing, correlating, estimating and updating are performed in a non-sequential symbol order.

23. (currently amended) The method according to claim 1, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are performed on a block of samples comprising said symbols.

24. (currently amended) The method according to claim 1, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are performed in a non-sequential symbol order on a block of samples comprising said symbols.

25. (currently amended) A method of equalization of symbols transmitted over a channel ~~having a length m and a channel impulse response h_i~~, said method comprising the steps of:

providing a sample shift register array comprising [[N]] a plurality of rows ~~wherein N represents the number of samples per symbol~~;

calculating a cross correlation coefficient matrix and an inverse matrix determinant based on a channel estimate;

generating the impulse response of a first number of previous symbols;

subtracting the impulse response of said first number of previous symbols from the contents of said register array;

cyclically shifting the contents of said register array through a second number of cycles constituting an iteration and repeating said steps of generating and subtracting ~~so as~~ to generate a modified received symbol wherein the influence of said first number of previously processed symbols is removed;

performing a matched filter operation on the contents of said shift register array;

generating an estimate of a symbol in accordance with the output of said matched filter; and

removing the influence of previously estimated symbols using said previously estimated symbols and said cross correlation coefficient matrix so as to yield soft symbol output. ~~Bn, and wherein m and N are positive integers.~~

26. (currently amended) The method according to claim 25, further comprising the step of quantizing said soft symbol output into a value representing a reliability ~~of said soft decision~~ thereof.

27. (currently amended) The method according to claim [[26]] 25, further comprising the step of quantizing said soft symbol output into a value representing [[the]] a reliability ~~of said soft decision~~ thereof, said value selected from the group comprising {-1, -1/2, 0, 1/2, 1}.

28. (currently amended) The method according to claim 25, wherein a length of said ~~length m~~ channel equals 16 symbols.

29. The method according to claim 25, wherein said symbols transmitted over the channel comprise 2-PSK symbols (Binary PSK (BPSK)).

30. The method according to claim 25, wherein said symbols transmitted over the channel comprise 4-PSK symbols (Quadrature PSK (QPSK)).

31. The method according to claim 25, wherein said symbols transmitted over the channel comprise Quadrature Amplitude Modulation (QAM) symbols.

32. The method according to claim 25, wherein the length of each row of said shift register array is proportional to the number of iterations of cyclical shifting performed.

33. (currently amended) The method according to claim 25, wherein said steps of calculating, generating, subtracting, cyclically shifting, performing a matched filter operation and removing are performed in a non-sequential symbol order on a block of samples comprising said transmitted symbols.

34. (currently amended) An iterative equalizer for equalizing, over a plurality of iterations, symbols transmitted over a channel having a channel impulse response h_i, comprising:

first means for iteratively removing [[the]] an influence of previous estimated symbols from a received symbol so as to generate a modified current received symbol and for correlating said modified current received

symbol with said channel impulse response to yield a matched filter output, a new modified received symbol and matched filter output generated every iteration of said equalizer;

second means for calculating a current symbol decision utilizing a previous symbol decision, the output of said matched filter and a cross correlation coefficient matrix; and

a quantizer adapted to quantize said current symbol decision to a quantized symbol decision having a finite number of possible values; and

third means for calculating a correction value comprising the difference between said current symbol decision calculated during the current iteration and said previous symbol decision calculated during the previous iteration.

35. The equalizer according to claim 34, wherein said first means comprises:

a plurality of sample shift registers, each sample shift register corresponding to one bit of an input sample, the input of each sample shift register comprising the output of a multiplexer, each multiplexer adapted to output either the output of a sample shift register fed back to said multiplexer or an input sample;

a plurality of multipliers adapted to generate a plurality of products, each multiplier adapted to calculate a portion of said influence of previous estimated symbols comprising the product of said channel response and said correction value;

a plurality of adders located in line with said sample shift registers and adapted to subtract said plurality of products from the current iteration of said modified received symbol so as to remove the influence of said previously estimated symbols; and

a summer adapted to sum said plurality of products to yield said matched filter output.

36. The equalizer according to claim 34, wherein said quantized symbol decision represents the reliability of said symbol decision.

37. The equalizer according to claim 34, wherein said quantizer is adapted to quantize said symbol decision into a value representing the reliability of said symbol decision, said value selected from the group comprising {-1, -1/2, 0, 1/2, 1}.

38. (currently amended) The equalizer according to claim 34, wherein said first means comprises means for calculating the influence of the n-1^{th} previous symbol in accordance with said previously estimated symbols and an inverse channel estimation coefficient matrix.

39. (currently amended) The equalizer according to claim 34, wherein [[the]] a length of said channel is 16 symbols.

40. The equalizer according to claim 34, wherein said symbols transmitted over the channel comprise 2-PSK symbols (Binary PSK (BPSK)).

41. The equalizer according to claim 34, wherein said symbols transmitted over the channel comprise 4-PSK symbols (Quadrature PSK (QPSK)).

42. The equalizer according to claim 34, wherein said symbols transmitted over the channel comprise Quadrature Amplitude Modulation (QAM) symbols.

43. The equalizer according to claim 34, wherein said first means comprises linear equalization means operating on one or more neighboring symbols.

44. The equalizer according to claim 43, wherein said linear equalization means utilizes an inverse channel estimation coefficient matrix.

45. (currently amended) The equalizer according to claim 34, further comprising means for running said equalizer through said plurality of iterations until an error difference between the symbol decision generated during the current iteration and [[the]] a symbol decision generated during the previous iteration is less than a predetermined value.

46. The equalizer according to claim 34, further comprising means for running said equalizer through a fixed number of iterations.

47. (currently amended) The equalizer according to claim 34, wherein said first means comprises ~~fourth~~ means for applying non-linear estimation to said matched filter output.

48. (currently amended) The equalizer according to claim 47, wherein said ~~fourth~~ means <u>for applying</u> comprises means for multiplying said matched filter output by a matrix and subsequently processing by a decision function.

49. The equalizer according to claim 48, wherein said matrix is obtained from inversion of a channel autocorrelation matrix.

50. The equalizer according to claim 48, wherein said decision function comprises a hard decision function.

51. The equalizer according to claim 48, wherein said decision function comprises a soft decision function.

52. The equalizer according to claim 48, wherein said decision function comprises a soft decision function adapted to utilize a hyperbolic tangent function.

53. The equalizer according to claim 48, wherein said decision function comprises a soft decision function whose decision slope changes over time.

54. The equalizer according to claim 48, wherein said decision function comprises a soft decision function whose decision slope increases over time.

55. (currently amended) A communications receiver for receiving and decoding an M-ary transmitted signal transmitted over a channel having a channel impulse response h_i, comprising:

a front end circuit for receiving and converting said M-ary transmitted signal to a baseband signal consisting of a plurality of received samples;

a demodulator adapted to receive said received samples and to generate input samples therefrom in accordance with the M-ary modulation scheme used to generate said transmitted signal;

an iterative equalizer operative to receive said input samples and to generate a sequence of symbol decisions therefrom, said iterative equalizer comprising processing means programmed to:

calculate the impulse response of previously estimated symbols utilizing said channel impulse response h_i and previously estimated decisions;

select a window having a size of one or more symbols and remove the influence of previously estimated symbols from the received signal so as to generate a modified received signal;

correlate said modified received signal with said channel impulse response to obtain a correlation for each symbol in the window;

estimate the results of the correlation so as to yield a new estimate of one or more of said transmitted symbols;

repeat said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~;

a decoder adapted to receive said estimate and to generate binary received data therefrom; and

wherein M is a positive integer.

56. (currently amended) The receiver according to claim 55, wherein said M-ary ~~symbol~~ signal comprises [[an]] 2-PSK ~~symbol~~ symbols (Binary PSK (BPSK)).

57. (currently amended) The receiver according to claim 55, wherein said M-ary ~~symbol~~ signal comprises [[a]] 4-PSK ~~symbol~~ symbols (Quadrature PSK (QPSK)).

58. (currently amended) The receiver according to claim 55, wherein said ~~symbols~~ signals transmitted over the channel comprise Quadrature Amplitude Modulation (QAM) symbols.

59. The receiver according to claim 55, further comprising a de-interleaver adapted to receive said estimates and whose output is subsequently input to said decoder for decoding into binary data therefrom.

60. The receiver according to claim 55, wherein said processing means is adapted to remove the influence of previously estimated symbols from the received signal by subtracting the impulse response of these symbols from the current receive sequence.

61. The receiver according to claim 55, wherein said processing means is adapted to estimate said correlation results using linear equalization operating on one or more neighboring symbols.

62. The receiver according to claim 55, wherein said processing means is adapted to calculate and remove the influence of the n-1^{th} previous symbol in accordance with said previously estimated symbols and an inverse channel estimation coefficient matrix.

63. (currently amended) The receiver according to claim 55, wherein [[the]] a length of said channel is 16 symbols.

64. (currently amended) The receiver according to claim 55, wherein said processing means is adapted to repeat the steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ until an error difference between the symbol decision generated during the current iteration and the symbol decision generated during the previous iteration is less than a predetermined value.

65. (currently amended) The receiver according to claim 55, wherein said processing means is adapted to repeat the steps of calculating, selecting, removing, correlating and ~~updating~~ estimating a fixed number of times.

66. An electronic data storage media storing a computer program adapted to program a computer to execute the iterative equalizer process of claim 55.

67. (currently amended) A computer readable storage medium having a computer program embodied thereon for causing a suitably programmed system to equalize symbols transmitted over a channel having a channel impulse response h_i by performing the following steps when such program is executed on said system:

calculating the impulse response of previously estimated symbols utilizing said channel impulse response h_i and previously estimated decisions;

selecting a window having a size of one or more symbols and removing [[the]] an influence of previous symbols from the received signal so as to generate a modified received signal;

correlating said modified received signal with said channel impulse response to obtain a correlation for each symbol in the window;

estimating the results of the correlation so as to yield a new estimate of one or more of said transmitted symbols;

repeating said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~; and

wherein M is a positive integer.

68. The computer readable storage medium according to claim 67, wherein said step of removing the influence of previous symbols comprises subtracting the impulse response of previous or future symbols from the current receive sequence.

69. (currently amended) The computer readable storage medium according to claim 67, wherein said step of estimating to yield a new estimate of the symbols after the influence of said ~~other~~ previous symbols is removed comprises using linear equalization operating on one or more neighboring symbols.

70. The computer readable storage medium according to claim 69, wherein the linear equalization is based on an inverse channel estimation coefficient matrix.

71. The computer readable storage medium according to claim 67, wherein said symbols transmitted over the channel comprise 2-PSK symbols (Binary PSK (BPSK)).

72. The computer readable storage medium according to claim 67, wherein said symbols transmitted over the channel comprise 4-PSK symbols (Quadrature PSK (QPSK)).

73. The computer readable storage medium according to claim 67, wherein said symbols transmitted over the channel comprise Quadrature Amplitude Modulation (QAM) symbols.

74. (currently amended) The computer readable storage medium according to claim 67, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are repeated until an error difference between the symbol decision generated during the current iteration and the symbol decision generated during the previous iteration is less than a predetermined value.

75. (currently amended) The computer readable storage medium according to claim 67, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are repeated for a fixed number of times.

76. (currently amended) The computer readable storage medium according to claim 67, wherein [[the]] a length of said channel is 16 symbols.

77. (currently amended) The computer readable storage medium according to claim 67, wherein said steps of calculating, selecting, removing, correlating[[,]] and estimating ~~and updating~~ are performed in a non-sequential symbol order on a block of samples comprising said transmitted symbols.